IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Enabling the Future - Developing the Space Workforce (5)

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LESSON LEARNED FROM USING RASPBERRY PI PAYLOAD DEVELOPMENT FOR THE THEOS-2 SMALLSAT MISSION

Abstract

Hands-on development of space hardware planned for flight provides a realistic environment for training alongside invaluable experience for those involved. The purpose of THEOS-2 (Thailand Earth Observation System) is to enhance the space capability in all aspects in Thailand and the key focus is capacity building in all of up-stream, mid-stream and down-stream elements of a space project. The up-stream domain was stated to implement the THEOS-2 SmallSAT under the program of Know-How Technology Transfer (KHTT) between SSTL and GISTDA over a two-year period in the United Kingdom and one year in Thailand for AIT/EVT activity. The THEOS-2 SmallSAT is aimed to operate for the earth observation satellite over low earth orbit type consists of optical first payload and AIS/ADS-B secondary payload. In addition to learning and being involved in the full spacecraft development process the customer engineers (CEs), who are GISTDA engineers are also responsible for delivering a third payload for the spacecraft to ensure that they can fully gain the experience and knowledge of satellite development in a safe environment with SSTL advice. The third payload development proposes a virtual very small satellite by using a Raspberry Pi for core control and using other sensors from Commercial Off-The Shelf (COTS) product such as Camera, Gyro, Magnetometer, sun sensor and GPS. The Concept of Operations (CONOPS) is to have a function of imaging the earth surface with approximate GSD 1 50 m. and imaging the satellite itself in another camera and also experiment attitude determination control mode to evaluate the performance itself during the satellite manner into very high accuracy pointing mode. Furthermore, the sun sensor component has been considered one suitable for a new development by the CEs as the scale of development aligns with the project timeline. The lesson learned of the development is expected to share and develop toward the capacity building of youth generation such undergraduate students in the emerging countries such Thailand to have the opportunity for real hand-on for space development. Finally, this paper is going to present the experience gained from the technical development and training aspects under the space industrial standard that how the quality is managed even though the high risk is acceptable for educational satellite mission. Moreover, the result is satisfied and approached to success that is because the team building as a key.